UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/560,023	**Confirmation Number:**	1005
Applicant:	Sun-Uk Kim, *et al.*		
Filed:	8 December 2005		
Art Unit:	1741		
Examiner:	Erin Lynn Snelting		
Attorney Docket:	136–2		
Customer No.:	66,390		

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313–1450

DECLARATION UNDER 37 C.F.R. § 1.132

I, Sun-Uk Kim, hereby declare as follows:

1. I received a Ph.D. in Ceramics from Alfred University in 1986, and I held a post-doctoral position with Alfred University from 1986 to 1987. I have been a research scientist at the Research Institute of Industrial Science and Technology (RIST) in Korea since 1987. During this time I was also a visiting researcher in the Materials Research Laboratory (MRL) at Penn State University. I consider myself an expert in the field of ceramics processing, especially in sol-gel processing methods. For example, my Ph.D. thesis was on the sol-gel processing of silica-titania systems, and my M.S. thesis was on the ion-exchange mechanism of aluminosilicate glasses.

2. I am a co-inventor listed on U.S. Patent Application 10/560,023 (hereinafter referred to as "the '023 Application").

3. I currently hold no ownership interest in the '023 Application.

4. I have reviewed and am familiar with the originally-filed disclosure of the '023 Application, including the originally-filed specification, drawings and claims. I am also familiar with the currently pending claims in the '023 Application.

5. I have reviewed and am familiar with U.S. Patent 5,650,129 (hereinafter referred to as "Kang"). I understand that Kang discloses a method of heat treating silica gel particles using a temperature gradient of 2°C min^{-1}. The Kang method seeks to achieve silica balls having a porous internal structure surrounded by a dense outside layer that is not porous.

6. I have reviewed and am familiar with U.S. Patent 5,076,980 (hereinafter referred to as "Nogues"). I understand that Nogues discloses a method that includes heat treating a large sol-gel monolith that has been cast into a mold. In the Nogues heat treatment, a temperature gradient of 8.3°C min^{-1} is disclosed. The Nogues heat treatment is performed as part of a densification step that produces either a fully densified and nonporous monolith or a partially densified monolith having a porous surface.

7. I have reviewed and am familiar with U.S. Patent 6,616,873 (hereinafter referred to as "Duraiswami"). I understand that Duraiswami discloses a method of heat treating oven dried spheres of talc, clay, alumina and magnesia. In the Duraiswami heat treatment a rotary kiln is used.

8. I performed, or supervised the performance of, an experiment wherein silica gel particles the same as those that Kang discloses were put into a rotary furnace and heated at 3°C min^{-1} up to a final temperature of 1050°C, which was maintained for 33.3 minutes, after which they were cooled to room temperature. Scanning electron microscope images showing the microstructure of the resulting product were generated; one such image is attached to this declaration as Exhibit A.

9. The microstructure shown in Exhibit A demonstrates that the experiment described in Paragraph 8 of this declaration disadvantageously results in an

end product with a low density and a non-uniform internal microstructure. The product is said to be "over-foamed," and as a result, cannot be used in many industrial applications.

10. I performed, or supervised the performance of, an experiment wherein silica gel particles similar to those disclosed in Kang were put into a rotary furnace and heated at 20°C min^{-1} up to a final temperature of 1050°C, which was maintained for 5 minutes, after which they were cooled to room temperature. Scanning electron microscope images showing the microstructure of the resulting product were generated; one such image is attached to this declaration as Exhibit B.

11. The microstructure shown in Exhibit B demonstrates that the products of the experiment described in Paragraph 10 of this declaration has densities that render these product useful for many industrial applications.

12. The relatively high density and uniformity of the microstructure shown in Exhibit B, as compared to the relatively low density and uniformity of the microstructure shown in Exhibit A, is a result of using a rotary furnace in combination with a relatively high temperature gradient, as compared to the 1°C min^{-1} to 2°C min^{-1} temperature gradients disclosed in Kang. At the time of our invention, it was unexpected that such superior properties could be achieved, even given the disclosures of Kang and Duraiswami.

13. All statements made herein that are of my own knowledge are true. All statements made herein on information and belief are believed to be true. All statements made herein are made with the knowledge that (a) willful false statements and the like, so made, are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001, and (b) such willful false statements may jeopardize the validity of this application or any patent issuing therefrom.

Sun-Uk Kim Dec. 22 2010

Sun-Uk Kim Date

EXHIBIT A

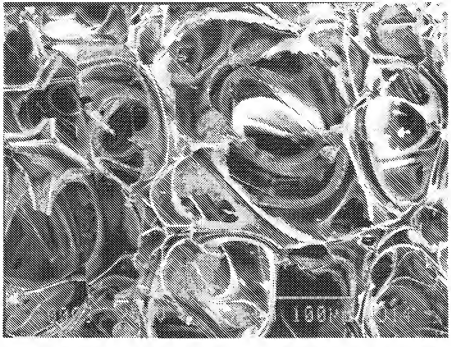

EXHIBIT B